

## LOW RESISTANCE AIR FILTER DEVICE

### TECHNICAL FIELD

- 5 The present invention relates to the technical field concerning filter devices of the air destined to the air-fuel mixture sucked by the combustion engines and refers to a low resistance air filter device.

The known filter devices comprise an air filter, having a form flattened, cylindrical or  
10 conic, contained in a respective case having an opening in flow communication with the air intakes and a further opening connected to the engine.

### BACKGROUND ART

- 15 Are known cases whose opening connected to the engine, and therefore downstream of the filter in comparison to the air flow, it introduces strong resistances and turbulences that cause the drawback to reduce the air flow to the engine.

Are known cases for filters provided with an inner link between the inlet opening and  
20 the side wall fit to reduce the air resistance.

- A drawback of such filtering devices consists in that the link allows the passage of possible extraneous object, for instance nuts or screw forgotten or fallen in the case of the filter, in the inlet collectors of the engine with serious damage risks of this latter.  
25 The risk of extraneous object presence is particularly relevant in the race filter devices that are continuously opened for inspections, cleaning, substitution also during hurried phases of job on different organs of the engine in the same time.

Further drawbacks of the said known filters consist in the fact that they increases the  
30 weight and they reduces the inside volume for the air.

### DISCLOSURE OF THE INVENTION

A purpose of the present invention is to propose an air filter device having low resistance and able to stop possible extraneous object, also of big dimensions, in the case.

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Further purpose of the present invention is to propose a device to reduce the air resistance without reducing the useful volume of the device and without getting heavy it.

10 Other purpose is to propose a device can be easily housed in the engine room.

The above mentioned objects are achieved according to the content of the claims.

#### BRIEF DESCRIPTION OF THE DRAWINGS

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The characteristics of the present invention are underlined in the following with particular reference to the enclosed drawings, in which:

- figure 1 shows a schematic longitudinal section view of the device of the present invention;
- 20 - figure 2 shows a longitudinally sectioned view sectioned by a longitudinal plan perpendicular to the one sectioning figure 1;
- figure 3 shows a top view of the figure 1 device.

#### BEST MODE OF CARRYING OUT THE INVENTION

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With reference to figures 1 - 3, 1 indicates a low resistance filter device for the feeding of combustion engines mainly including a tubular case 2, a filtering element 3, support means 4 and a outlet means 8.

30 The tubular case 2 has an elliptic or oval section and it is provided with an lower opening 9 and an upper 10. Furthermore the tubular case is preferably made of carbon fiber so that it releases a thermal insulator between the external environment and the air

crossing it. The tubular case 2 is fixed to the support means 4 by fixing means 14 consisting of screw or of fastener.

5 The outlet means 8 are constrained to a upper opening 10 of the tubular case 2 and they are centrally provided of an outflow opening 7 in correspondence of which they present a tubular body 11 protruding toward inside of said tubular case 2. Such tubular body 11 connects, in flow communication, the inside volume of the tubular case 2 with the outflow opening 7 the same.

10 The form of outlet means 8 is similar to shaped flange integral with the tubular body 11 being shaped as the trumpet outlet.

Preferably the trumpet of the tubular body 11 expands, or enlarges, toward inside of the device 1. In alternative, the invention provides that the tubular body 11 is narrowed, or  
15 is restricted, toward inside of the device 1 assuming a truncated ogive shape.

The outlet means 8 are peripherally provided of a recess 14 for the housing of the inside wall of the tubular case 2 in its upper opening 10. The outlet means 8 are detachably fixed to the tubular case 2 by means of screw or fastener fixing means 15.  
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The device includes support means 4 fixed at the lower opening 9 of the case 2 and fit to constrain the filtering element 3 at one inlet opening 5 for the air of the support means 4 the same.

25 The support means 4 are discoid shaped and centrally provided of the inlet opening 5 linkable to the air intakes of the vehicle. An inner throat of the support means 4 houses an end of the filtering element 3 that can be fixed integral with the support means 4, for instance by means of adhesive or plastic material melting. In alternative the end of the filter can be detachably housed in a respective throat, annular seat shaped, of the  
30 support means 4.

The support means 4 are peripherally provided of a seat 13 for housing the inner wall of

the tubular case 2 at the lower opening 9. They are made of nylon strengthened with glass fiber.

5 The filtering element 3 has cylindrical form and is made of cotton soaked with low viscosity oil. It is internally provided of air deflecting means 6, connected to the free end of the filtering element 3 in such way that the air flow entering from the opening 5, and pointed out by the arrows F of figure 1, it is forcedly deflected by the deflecting means 6 toward the filtering element 3. The deflected air flow crosses the filtering element 3, it crosses the interspace formed by this latter and the external case 2 and it exits, through 10 the tubular body 11, out the outflow opening 7 entering inside air ducts in direction of the engine.

The deflecting means 6 are substantially shaped as a cone whose vertex is directed toward the inlet opening 5 and whose base is integral fixed to the free edge of the 15 filtering element 2. In alternative it is provided that the free edge of the filtering element 2 detachably matches the base of the deflecting means 6. The substantially conic shape of the deflecting means 6 can have a concave profile 6a or convex 6b for instance of parabolic kind. More in detail, said almost conic shape of said deflecting means 6 has an axial section shaped as two half-parabolas with parallel axes and joined branches at the 20 vertex of the deflecting means 6 making the concave 6a or the convex 6b profile.

The device includes spacer means 20, for instance made of plastics and of prismatic form, interposed between the tubular body 11 and the filtering element 3 and matching the inner wall of the tubular case 2 for the centering and stopping of the filtering 25 element 3.

The operation of the device provides that the recess between the tubular body 11 and the inside wall of the tubular case 2 form a sort of trap fit to prevent or to reduce the risk of the passage, toward the engine, of extraneous objects as nuts, screws, washer, split pin 30 and the like. The conformation of the tubular body 11 provides a low resistance and low dynamic losses of air flow feeding the engine without heaviness and without reducing the inside volume of the device in a remarkable manner.

An advantage of the present invention is to propose an air filter device having low resistance able to stop extraneous object, also having big dimensions, inside the case downstream filter without reducing the useful volume of the device and without getting heavy it.

Other advantage is to propose a device can be easily housed in the engine room trough its oval or elliptic section shape.